

**APPENDIX A:  
FIXED WIRELESS VOICE AND DATA SERVICES**

**I. INTRODUCTION AND OVERVIEW**

In this section, the Commission reviews the current state of the fixed wireless industry.<sup>685</sup> The first part of Appendix A provides an overview of fixed wireless systems. The second part discusses recent developments in the industry, including the current level of service deployment and significant policy changes related to spectrum bands used for fixed wireless service.

Fixed wireless operators have used several spectrum bands, including Multipoint Distribution Service ("MDS"),<sup>686</sup> Wireless Communications Service ("WCS"),<sup>687</sup> unlicensed spectrum bands, 24 GHz, Local Multipoint Distribution Service ("LMDS"), and 39 GHz, to offer point-to-point, high-speed data services. In addition, some licensees of spectrum bands traditionally used for CMRS have also used that spectrum to provide fixed wireless services.<sup>688</sup>

This report groups fixed wireless operators into two major categories: lowerband providers (800 MHz to 5.8 GHz) and upperband providers (24 GHz to 39 GHz) due to the similar technical characteristics of the bands within each category.<sup>689</sup>

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<sup>685</sup> "Fixed wireless" services are also sometimes referred to as "wireless broadband" or "wireless DSL." For a description of fixed wireless systems, see *Sixth Report*, at 13433-13437. For a more comprehensive discussion of competition in the fixed wireless industry and broadband telecommunications services generally, see *Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion, and Possible Steps To Accelerate Such Deployment Pursuant to Section 706 of the Telecommunications Act of 1996*, *Third Report*, 17 FCC Rcd 2844 (2002).

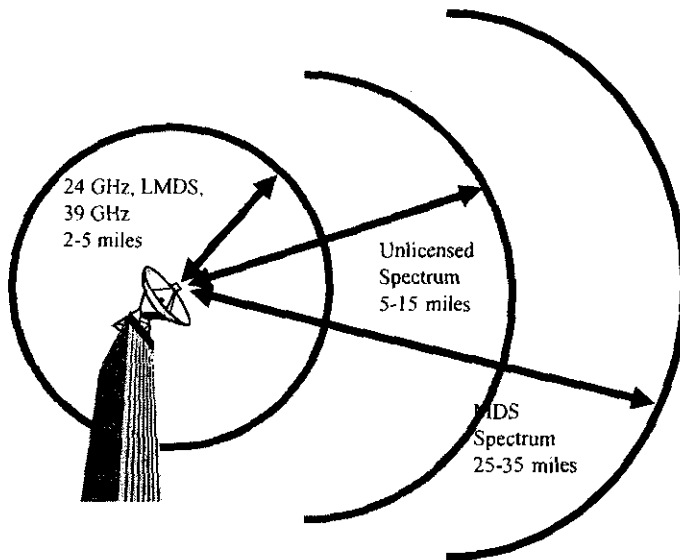
<sup>686</sup> What is commonly referred to as MDS or MMDS spectrum includes 33 different 6 megahertz channels in the 2.1-2.2 GHz and 2.5-2.7 GHz spectrum bands. These channels include the Multipoint Distribution Service ("MDS"), Multichannel Multipoint Distribution Service ("MMDS"), and Instructional Television Fixed Service ("ITFS") channels. MDS operators generally use the MMDS and MDS channels and lease excess capacity from ITFS operators.

<sup>687</sup> The WCS band is located at 2305-2320 MHz and 2345-2360 MHz and surrounds the Digital Audio Radio Service ("DARS") spectrum at 2320-2345 MHz.

<sup>688</sup> "Licensees of cellular systems may use alternative cellular technologies and/or provide fixed services on a co-primary basis with their mobile offerings, including personal communications services . . . on the spectrum within their assigned channel block." 47 CFR § 22.902(d).

<sup>689</sup> The lowerbands consist of the cellular (800 MHz) and broadband PCS (1900 MHz) bands, the MDS (2.5-2.7 GHz) band, the WCS (2.3 GHz) band, and the unlicensed bands. The upperbands consist of the 24 GHz (DEMS) band, the LMDS (28 GHz) band, and the 39 GHz band.

Figure 1. Fixed Wireless Coverage Radii



Operators using lowerband spectrum are able to serve a wider geographic area with a single transmitter than operators using upperband spectrum (see Figure 1). Lowerband systems generally have a service radius of five to 35 miles from a central hub, depending on the particular spectrum band, the power of the transmitter, and the terrain. Upperband systems, on the other hand, face significant losses of signal strength due to atmospheric conditions, most notably precipitation (*i.e.*, rain, snow, and fog).<sup>690</sup> Therefore, the range of individual transmitters in the upperbands is approximately two to five miles.

## II. RECENT DEVELOPMENTS

### A. Upperband Operations

As discussed in the *Sixth and Seventh Reports*, all of the major upperband fixed wireless providers – Winstar Communications, Inc. (“Winstar”), Teligent, Inc. (“Teligent”), Advanced Radio Telecom (“ART”), and XO Communications, Inc. (“XO”) – filed for bankruptcy during 2001 and 2002.<sup>691</sup> In recent months, many have emerged from bankruptcy with plans to continue providing fixed wireless services but on a more limited basis. Teligent, which filed for bankruptcy in May 2001, completed its reorganization and exited bankruptcy in September 2002 with a business plan focused on selling transport capacity to other telecommunications companies wholesale and to multi-location businesses as well as offering dedicated Internet access to large business customers.<sup>692</sup> Teligent has retained its 24

<sup>690</sup> However, by adjusting factors such as cell size and transmission power, the networks can be engineered to the standard level of reliability in a telecommunications network, 99.999 percent. This level of reliability is also known as “five 9’s.” See *Sixth Report*, at 13435, note 602.

<sup>691</sup> See *Seventh Report*, at A-2 – A-4.

<sup>692</sup> *Teligent Completes Its Reorganization – Company Exits Bankruptcy Fully Funded and Debt Free*, News Release, Teligent, Sept. 12, 2002; John Rubino, *Teligent Rising*, VIRGINIA BUSINESS, Nov. 1, 2002, at 56-58, 61 (citing Teligent CEO James Continenza).

GHz licenses in 74 markets.<sup>693</sup>

Winstar filed for bankruptcy protection in April 2001 and was acquired by IDT Corporation ("IDT") in December 2001. IDT holds the former Winstar's 28 GHz and 39 GHz licenses and has continued to offer many of the fixed wireless services that Winstar offered before it entered bankruptcy, including local and long distance telephone service, high-speed Internet and data services, and Frame Relay Services.<sup>694</sup> IDT's Winstar subsidiary currently operates in 22 markets and generated \$79.6 million in revenue between December 2001 and July 2002.<sup>695</sup> IDT changed the name of its Winstar subsidiary to IDT Solutions in March 2003.<sup>696</sup>

XO entered bankruptcy in June 2002 and completed its reorganization in January 2003.<sup>697</sup> The company is primarily a wireline CLEC but also holds LMDS and 39 GHz licenses covering 95 percent of the population of the 30 largest U.S. cities, and was able to continue funding its operations during its bankruptcy proceedings.<sup>698</sup> XO uses its spectrum to deploy fixed wireless connections for business customers to whom it is not cost-efficient to construct a fiber optic connection.<sup>699</sup>

First Avenue Networks, which purchased Advanced Radio Telecom's ("ART") 39 GHz licenses during ART's 2001 bankruptcy proceedings, now offers fixed wireless access on a wholesale basis to other carriers.<sup>700</sup>

## B. Lowerband Operations

As discussed in the *Seventh Report*, AT&T Wireless and Sprint both announced in the fall of 2001 that they were terminating their fixed wireless operations.<sup>701</sup> And in July 2002, just prior to its bankruptcy filing, WorldCom Inc. ("WorldCom"), announced that it planned to discontinue or divest its fixed wireless operations.<sup>702</sup> The company announced in May 2003 that BellSouth plans to purchase

<sup>693</sup> *Teligent Completes Its Reorganization – Company Exits Bankruptcy Fully Funded and Debt Free*, News Release, Teligent, Sept. 12, 2002.

<sup>694</sup> IDT Corporation, SEC Form 10-K, Oct. 29, 2002, at 17, 21-24.

<sup>695</sup> IDT Corporation, SEC Form 10-K, Oct. 29, 2002, at 17.

<sup>696</sup> *IDT Corporation Announces that Winstar Will Become IDT Solutions*, News Release, IDT, Dec. 12, 2002.

<sup>697</sup> *See Seventh Report*, at A-4; *XO Emerges from Bankruptcy*, RCR WIRELESS NEWS, Jan. 20, 2003, at 6. As part of the reorganization, telecom financier Carl Icahn now has an 80 percent ownership interest in the company. *Id.*

<sup>698</sup> *See Seventh Report*, at A-4.

<sup>699</sup> XO Communications, SEC Form 10-K, Mar. 21, 2003, at 12.

<sup>700</sup> *See Seventh Report*, at A-4; First Avenue Networks, *Strategy* (visited Jun. 25, 2003) <<http://www.firstavenet.com/>>.

<sup>701</sup> *See Seventh Report*, at A-4 – A-5

<sup>702</sup> Dan Meyer, *WorldCom Plans Wireless Exit*, RCR WIRELESS NEWS, July 8, 2002, at 1; Chris Nolter, *M&A Work at WorldCom Cooled in February*, DAILY DEAL, Apr. 17, 2003.

WorldCom's fixed wireless assets, including its licenses, for \$65 million.<sup>703</sup> WorldCom had been offering high-speed, fixed wireless Internet access service to business customers in 13 U.S. markets using both MDS and WCS spectrum.<sup>704</sup>

Despite the reorganizations and service terminations by all of the major fixed wireless providers, several smaller fixed wireless operators, including hundreds of operators using unlicensed spectrum,<sup>705</sup> continue to provide high-speed Internet access service, generally in less densely populated markets across the country and often in only a few markets apiece. Most of the companies that use unlicensed spectrum to offer Internet access are local and regional Internet service providers, also referred to as wireless ISPs, that offer the service in an average of three markets apiece.<sup>706</sup> Many of these carriers are targeting business customers, while others serve both businesses and residences. Many fixed wireless operators use lowerband spectrum to offer high-speed Internet access in rural and underserved areas. For example, Canyon Country Communications offers Internet access in Page, AZ; Planet Connect offers fixed wireless service in Bristol, Seymour, Newport, and Greeneville, TN; and DATACentric sells the service in Lufkin, Conroe, and Bryan-College Station, TX.<sup>707</sup>

As mentioned in the *Sixth Report*, the Commission tracks the rollout of fixed wireless services by providers using lowerband spectrum on a county-by-county basis. Based on its analysis, the Commission estimates that there are at least 212 different lowerband operators providing fixed wireless services in 457 different counties.<sup>708</sup> These counties contain 106 million people, or 37.3 percent of the U.S. population.<sup>709</sup> This analysis is based on publicly-available information, such as news articles and operators' press releases, SEC filings, and web sites. There are several

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<sup>703</sup> Kristin Beckman, *WorldCom Assets Go to BellSouth*, RCR WIRELESS NEWS, May 19, 2003, at 17; Chris Nolter, *BellSouth Bids for WorldCom Unit*, DAILY DEAL, May 13, 2003.

<sup>704</sup> See *Seventh Report*, at A-6.

<sup>705</sup> Unlicensed spectrum consists of 26 megahertz in the 900 MHz band, 83.5 megahertz in the 2.4 GHz band, and 300 megahertz in the 5 GHz band. See, generally, 47 C.F.R. Part 15. Unlicensed spectrum is used for many purposes, including short-range data transmission technologies such as Bluetooth and 802.11, cordless phones, microwave ovens, and amateur radio. The spectrum is also used for WiFi access. See Section II.C.3.f, WiFi, *supra*. Companies using unlicensed spectrum to offer fixed wireless point-to-point broadband services primarily use the 2.4 GHz band, while some reportedly employ both the 2.4 GHz and 5 GHz bands for such services. Unlicensed fixed applications generally employ spread spectrum technology for long range transmissions in order to minimize the risk of interference with other operators. See *Sixth Report*, at 13439.

<sup>706</sup> Many of these companies offer traditional wireline dial-up Internet access as well. See *Sixth Report*, at 13444. See also, Nancy Gohring, *Wireless ISPs: Emerging from the Shadows*, BROADBAND WIRELESS BUSINESS, March/April 2002, at 1, 8. Many of the small wireless ISPs believe that by offering service and becoming profitable in only one or a few markets before expanding to other markets, they will remain financially viable. *Id.*

<sup>707</sup> See *Sixth Report*, at 13444.

<sup>708</sup> See Appendix E, Map 10, at E-11.

<sup>709</sup> Based on the 2000 Census. Many of these lowerband providers serve only business customers. Residential fixed wireless Internet access is available in at least 338 different counties. These counties contain approximately 62 million people or 22 percent of the U.S. population.

caveats to note when considering this data. First, in order to be considered as “covering” a county, an operator need only be offering service in a portion of that county. Second, the POPs and square mile figures in this analysis include all of the POPs and all of the square miles in a county considered to have coverage. Third, all population figures are based on the 2000 Census. Fourth, because some lowerband carriers serve small and remote locations and because unlicensed operators provide service without a license from the Commission, it is difficult to assess precisely who is operating where. Therefore, the analysis may not include certain companies that do not make the information on their fixed wireless offerings easily obtainable or publicly available.

### C. Spectrum Allocation Proceedings

As mentioned in the *Seventh Report*, the Commission decided to permit mobile use of the 2500-2690 MHz band by MDS licensees in September 2001.<sup>710</sup> In March 2003, the Commission initiated a proceeding to facilitate the provision of fixed and mobile broadband access, as well as educational services, in the 2500-2690 MHz bands. With this action, the Commission began a comprehensive examination of the rules and policies governing these bands in order to provide greater opportunities for increased access to the spectrum and encourage efficient use of the spectrum.<sup>711</sup>

In addition, in November 2002, the Commission announced the reallocation of 2150-2155 MHz portion of the 2150-2160/62 MDS band for fixed and mobile services, including new, advanced wireless services that will be offered over next generation networks.<sup>712</sup> MDS licensees currently use this band primarily for the upstream links in two-way, fixed wireless broadband services.<sup>713</sup>

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<sup>710</sup> See *Seventh Report*, at A-8.

<sup>711</sup> Amendment of Parts 1, 21, 73, 74 and 101 of the Commission's Rules to Facilitate the Provision of Fixed and Mobile Broadband Access, Educational and Other Advanced Services in the 2150-2162 and 2500-2690 MHz Bands, WT Docket No. 03-66, *Notice of Proposed Rulemaking and Memorandum Opinion and Order*, 18 FCC Rcd 6722 (2003).

<sup>712</sup> Service Rules for Advanced Wireless Services in the 1.7 GHz and 2.1 GHz Bands, WT Docket No. 02-353, *Notice of Proposed Rulemaking*, 17 FCC Rcd 24135 (2002).

<sup>713</sup> Under an informal agreement among MDS licensees, the principal use of this spectrum is for upstream communications to hub receiving facilities. *Id.*

**APPENDIX B:  
U.S. INVESTMENT IN FOREIGN MOBILE OPERATORS**

The divestiture of stakes in foreign mobile telephone companies by U.S. mobile operators, a trend identified in the *Sixth Report*<sup>1</sup> and the *Seventh Report*,<sup>2</sup> continued in the second half of 2002 and in 2003.

SBC Communications shed two of its foreign mobile holdings in the past year. In November 2002, Canadian telecom conglomerate BCE, Inc. notified SBC Communications of its intention to exercise its right to buy SBC's remaining 20 percent stake in BCE mobile subsidiary Bell Canada for \$3.2 billion.<sup>3</sup> SBC completed the sale of its interest in Bell Canada to BCE in December 2002.<sup>4</sup> The following January, SBC finalized the sale of its 15 percent equity stake in France's Cegetel Groupe SA to London-based wireless carrier Vodafone Group plc for approximately \$2.3 billion in cash.<sup>5</sup> Cegetel is a joint venture that owns 80 percent of Societe Francaise de Radiotelephone, the second-largest wireless provider in France. SBC Communications subsequently reported that it realized a gain of \$1.6 billion from the Cegetel sale.<sup>6</sup>

Western Wireless International Corporation ("WWI"), a subsidiary of Western Wireless, also divested two of its foreign mobile holdings in the past year. WWI announced the closing of the sale of its 57.3 percent interest in Icelandic wireless operator Tal hf to Islandssimi hf in November 2002.<sup>7</sup> WWI's net proceeds from the transaction were expected to total approximately \$28.9 million. In June 2003, WWI announced its agreement to sell its 19 percent interest in Croatia wireless operator VIPnet d.o.o. to Mobilcom Austria Aktiengesellschaft & CO KG, the majority owner of VIPnet.<sup>8</sup> WWI expected that proceeds from the sale of its interest and related shareholder debt would be \$70 million.

In June 2003, Atlantic West, a 50/50 joint venture between Verizon Communications and AT&T Wireless, succeeded in its longstanding effort to sell the U.S. operators' combined 49 percent stake in Czech mobile operator Eurotel Praha to Czech telephone operator Cesky Telecom, the owner of the remaining 51 percent stake in Eurotel. As detailed in the *Seventh Report*,<sup>9</sup> Atlantic West had reached a preliminary agreement on the sale with Cesky Telecom for a price of \$1.5 billion in July 2001, but Cesky Telecom subsequently cut the offered price to \$1.1 billion and negotiations were ultimately abandoned in November 2001 after the parties failed to agree on the purchase price and Atlantic West rejected Cesky

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<sup>1</sup> See *Sixth Report*, at 13388-13389.

<sup>2</sup> See *Seventh Report*, at 13028-13030.

<sup>3</sup> *BCE to Buy Out SBC's Bell Canada Stake*, TR DAILY, Nov. 11, 2002.

<sup>4</sup> *Investor Briefing*, SBC Communications, Inc., Jan. 28, 2003, at 8.

<sup>5</sup> *Id.*

<sup>6</sup> *Investor Briefing*, SBC Communications, Inc., Apr. 24, 2003, at 11.

<sup>7</sup> *Western Wireless International Announces Closing of Sale of Interest in Icelandic Wireless Operator*, News Release, Western Wireless Corporation, Nov. 26, 2002.

<sup>8</sup> *Western Wireless International Agrees to Sell Interest in Croatia Wireless Operator*, News Release, Western Wireless Corporation, June 4, 2003.

<sup>9</sup> See *Seventh Report*, at 13030.

Telecom's latest offer. Negotiations later resumed and the parties finally reached an agreement this past year. On June 5, 2003, the Board of Directors of Cesky Telecom approved the terms of a preliminary agreement with Atlantic West to purchase the remaining 49 percent stake that it does not already own in its mobile telephony unit Eurotel Praha.<sup>10</sup> The parties agreed on a price of \$1.05 billion to be paid in cash. In a related move, Eurotel owners declared that a dividend of \$415 million will be paid prior to the closing of the transaction. The dividend payment raises the value of the sale to an estimated \$1.25 billion.<sup>11</sup>

Verizon announced on June 13, 2003 that it plans to sell its 39.4 percent equity stake in Mexican wireless carrier Grupo Iusacell to Movil Access, a Mexican company and wireless telecom investor, following approval of the latter's offer by the Mexican securities commission.<sup>12</sup> Movil Access offered to acquire 100 percent of Grupo Iusacell's stock for \$10 million, plus the assumption of \$814 million in Iusacell debt.<sup>13</sup> Vodafone Americas, which owns another 35 percent equity stake in Grupo Iusacell, is also reported to be planning to accept the offer. Bell Atlantic Corporation, which later merged with GTE Corporation to form Verizon, paid \$1 billion for its Iusacell stake in 1993, while Vodafone bought its share in Iusacell for \$973.4 million in 2001.<sup>14</sup>

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<sup>10</sup> *Board Approves Principal Terms of Acquisition of Eurotel*, Press Release, Cesky Telecom, June 5, 2003.

<sup>11</sup> Linda Mutschler, *AT&T Wireless – Czech Deal Approved*, Global Equity Research, Merrill Lynch, June 5, 2003, at 1.

<sup>12</sup> *Verizon Communications Announces Plans To Sell its Equity Stake in Iusacell*, Press Release, Verizon Communications, June 13, 2003.

<sup>13</sup> *Verizon To Sell Iusacell Stake*, TRDAILY, June 13, 2003; Joel Millman and Santiago Perez, *Verizon, Vodafone Sell Iusacell, Ending Costly Mexico Venture*, THE WALL STREET JOURNAL, June 16, 2003, at B3.

<sup>14</sup> Joel Millman and Santiago Perez, *Verizon, Vodafone Sell Iusacell, Ending Costly Mexico Venture*, THE WALL STREET JOURNAL, June 16, 2003, at B3.

**APPENDIX C:  
LOWER 700 MHz AUCTION #44 RESULTS**

Bidder Name	Total High Bids	Net High Bids (1)	POPs
Aloha Partners, L.P.	77	\$28,793,380	117,383,349
Vulcan Spectrum LLC	24	\$15,075,000	7,236,558
Cavalier Group, LLC	7	\$6,472,050	24,617,122
Union Telephone Company	16	\$4,452,000	2,670,974
LIN Television Corporation	18	\$4,293,000	7,475,819
DataCom Wireless, L.L.C.	3	\$3,303,950	11,053,041
Harbor Wireless, LLC	14	\$2,836,600	8,487,727
MilkyWay Broadband, LLC	48	\$2,757,105	10,405,189
Redwood County Telephone Company	17	\$1,984,500	6,552,179
David M. Gates	7	\$1,742,000	3,871,000
Whidbey Telephone Company	3	\$1,212,100	675,464
Lynch 3G Communications Corporation	8	\$1,118,000	1,722,987
Capitol Broadcasting Company, Inc.	12	\$888,000	2,963,816
Corr Wireless Communications, LLC	9	\$762,000	2,643,203
PGTV, Inc.	1	\$740,350	2,097,447
East Kentucky Network, LLC	9	\$643,000	1,856,852
Bluegrass Cellular, Inc.	9	\$639,000	1,886,924
Ronan Telephone Company	3	\$618,000	374,399
KanOkla Telephone Association, Inc.	4	\$475,150	479,533
Lexcom Telephone Company	1	\$453,000	914,232
First Cellular of Southern Illinois	7	\$423,000	1,405,713
Chariton Valley Communication Corporation, Inc.	6	\$397,800	605,695
Cameron Communications Corporation	6	\$340,000	1,076,431
Banks Broadcasting, Inc.	2	\$326,400	468,783
Agri-Valley Communications, Inc.	7	\$320,450	1,253,761
Blue Valley Tele-Communications, Inc.	2	\$293,250	190,348
Kennebec Telephone Company, Inc.	11	\$283,400	696,004
Public Service Wireless Services, Inc.	4	\$250,000	832,638
SJI, Inc.	4	\$249,000	828,045
Lackawaxen Long Distance Company, Inc.	4	\$247,000	826,262
Citizens Telephone Cooperative	4	\$246,000	723,276
Nemont Communications, Inc.	2	\$243,950	136,385
CT Communications, Inc.	3	\$238,000	789,808
PVT Networks, Inc.	1	\$231,000	226,366
Peoples Telephone Cooperative, Inc.	3	\$230,350	904,559
The Ponderosa Telephone Co.	1	\$219,300	303,190
Mobius Communications Company	4	\$197,250	282,744
Grand River Communications, Inc.	8	\$184,000	501,900
Kaplan Telephone Company, Inc.	2	\$181,500	581,272
Craw-Kan Telephone Cooperative, Inc.	5	\$172,550	650,983
Central Wisconsin Communications, Inc.	2	\$167,450	384,203
Plateau Telecommunications, Inc.	2	\$166,000	370,422
XIT Telecommunications & Technology, Ltd.	4	\$159,800	555,697
Dickey Rural Services, Inc.	3	\$143,650	351,093
Eastern Colorado Wireless Partnership	4	\$143,100	259,898
Star Wireless LLC	4	\$137,150	600,171
Waller, Inc.	3	\$121,500	518,389
McElroy Electronics Corporation	2	\$118,300	604,893



The Tri-county Telephone Association, Inc.	2	\$117,750	184,012
3G COMM, LLC	1	\$116,350	315,121
Glenwood Telephone Membership, Corporation	3	\$115,500	253,961
Missouri RSA No. 7 L.P. dba Mid-Missouri Cellular	1	\$107,000	157,047
McBride Spectrum Partners I, LLC	4	\$102,505	526,323
Triangle Communication System, Inc.	3	\$102,000	126,308
ComSouth Tellular, Inc.	2	\$96,750	432,349
San Carlos Apache Telecommunications Utility, Inc.	2	\$96,000	318,457
Allcom Communications, Inc.	1	\$90,000	210,908
FTC Management Group, Inc.	2	\$90,000	300,683
Rainbow Telephone Cooperative Association, Inc.	3	\$87,750	386,017
Scott Reiter	1	\$84,500	433,785
MTC North, Inc.	1	\$84,000	374,182
Northeast Nebraska Telephone Company	2	\$84,000	256,395
GTC Wireless, Inc.	2	\$82,500	367,183
Holland Wireless, L.L.C.	1	\$80,750	316,633
Poka Lambro Telecommunications, Ltd.	3	\$76,500	256,348
Swayzee Telephone Company	2	\$73,500	324,177
Cable & Communications Corporation	4	\$73,015	189,871
Chequamegon Telephone Cooperative, Inc.	2	\$72,000	321,299
WSS, L.L.C.	2	\$69,000	305,276
North Dakota Network Co.	1	\$67,000	61,933
Kingdom Telephone Company	1	\$66,000	92,590
CTC Telcom, Inc.	2	\$61,500	239,922
Guadalupe Valley Communications Systems, L.P.	2	\$61,000	204,342
Star Telephone Company, Inc.	1	\$61,000	180,185
Webster-Calhoun Cooperative Telephone Association	2	\$54,750	244,541
BPS Telephone Company	1	\$50,150	197,439
BEK Communications Cooperative	2	\$41,250	136,048
Beulahland Communications, Inc.	1	\$38,350	123,051
Tri-County Communications, Inc.	1	\$36,000	110,131
Guam Cellular and Paging	1	\$34,000	133,152
Advantage Cellular Systems, Inc.	1	\$33,750	150,599
McDonald County Telephone Company	1	\$33,000	93,482
Farmers Cellular Telephone, Inc.	1	\$31,450	121,990
DYCOM Holding, Inc.	1	\$29,750	115,644
Alpine Communications, L.C.	1	\$28,900	114,478
Northern New Mexico Telecom, Inc.	1	\$27,300	22,300
Arctic Slope Telecommunications and Cellular, Inc.	1	\$26,250	118,282
Mark Twain Communications Company	1	\$24,000	55,897
United Telephone Association, Inc.	3	\$23,850	104,466
Yell County Telephone Company, Inc.	1	\$23,250	104,770
C&W Enterprises, Inc.	1	\$22,500	98,458
City of Ketchikan dba Ketchikan Public Utilities	1	\$21,000	68,989
Pioneer Telephone Association, Inc.	1	\$20,400	80,134
West Wisconsin Telcom Cooperative, Inc.	1	\$20,250	89,365
Montana Spectrum Alliance	1	\$19,550	77,691
H&B Communications, Inc.	1	\$18,750	82,345
Farmers Telephone Company, Inc.	1	\$18,000	59,620
Nortex Communications Company	1	\$18,000	80,087
S&T Communications Inc	2	\$17,775	49,224
Great Plains Communications, Inc	1	\$17,000	35,875
Panhandle Telecommunication Systems, Inc.	1	\$7,700	25,743

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Blanca Telephone Company	1	\$7,500	27,520
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Source: Federal Communications Commission

Notes: (1) As of the close of the auction.

## LOWER 700 MHz AUCTION #49 RESULTS

Bidder Name	Total High Bids	Net High Bids (1)	POPs
QUALCOMM Incorporated	5	\$38,036,000	237,029,635
Aloha Partners II, L.P.	89	\$5,816,590	22,873,669
Cavalier Group, LLC	44	\$2,143,050	11,379,618
LIN Television Corporation	13	\$1,980,000	3,374,467
Vermont Telephone Company, Inc.	5	\$1,628,600	1,577,173
D&E Investments, Inc.	5	\$828,000	1,229,242
Whidbey Telephone Company	7	\$652,800	1,244,671
Lynch 3G Communications Corporation	4	\$620,000	1,053,479
Lima Directional Paging Co., Inc.	3	\$513,750	587,652
Banks Broadcasting, Inc.	4	\$513,000	709,789
Valley Telephone Cooperative, Inc.	3	\$451,350	656,014
Viacel Corporation	2	\$403,910	760,069
AGRI-VALLEY COMMUNICATIONS, INC.	2	\$341,700	678,656
United Telephone	10	\$341,250	NA
BPS Telephone Company	5	\$300,050	675,436
Peoples Telephone Cooperative, Inc.	3	\$294,100	491,572
KM Communications, Inc.	3	\$237,150	286,664
Adams Telcom, Inc.	2	\$201,750	415,537
Westelcom Network, Inc.	2	\$192,000	480,944
Corr Wireless Communications, LLC	3	\$189,550	640,315
Delta Media Corporation	4	\$161,200	448,811
DataCom Wireless, L.L.C.	4	\$139,100	876,163
WCTA Wireless Inc.	1	\$133,450	106,046
David M. Gates	7	\$123,760	1,240,017
Pioneer Telephone Cooperative, Inc.	3	\$122,000	281,107
CAPITOL BROADCASTING COMPANY, INC.	4	\$101,000	663,594
Grand River Communications, Inc.	4	\$86,700	532,659
Wireless Network Management	2	\$85,500	187,384
Kennebec Telephone Company	2	\$57,200	185,826
Red River Rural Telephone Association, Inc.	1	\$43,350	214,745
McBride Spectrum Partners II, LLC	1	\$25,350	103,833
Bluegrass Cellular, Inc.	1	\$25,000	91,545
Acumen Technologies, Inc.	1	\$11,050	142,982
RED LAKE BAND OF CHIPPEWA INDIANS	1	\$9,800	65,227
American Samoa Telecommunications Authority	1	\$6,900	57,291

Source: Federal Communications Commission

Notes: (1) As of the close of the auction.

**APPENDIX D:  
MOBILE TELEPHONY**

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**Table 1: CTIA's Semi-Annual Mobile Telephone Industry Survey**

Date	Estimated Subscribers	Year End over Year End Subscriber Increase	Total Six-Month Service Revenues (000s)	Roamer Services Revenues	Cell Sites	Employees	Cumulative Capital Investment (000s)	Average Local Monthly Bill
Jan 85	91,600		\$178,085		346	1,404	\$354,760	
June 85	203,600		\$176,231		599	1,697	\$588,751	
Dec 85	340,213	248,613	\$306,197		913	2,727	\$911,167	
June 86	500,000		\$360,585		1,194	3,556	\$1,140,163	
Dec 86	681,825	341,612	\$462,467		1,531	4,334	\$1,436,753	
June 87	883,778		\$479,514		1,732	5,656	\$1,724,348	
Dec 87	1,230,855	549,030	\$672,005		2,305	7,147	\$2,234,635	\$96.83
June 88	1,608,697		\$886,075		2,789	9,154	\$2,589,589	\$95.00
Dec 88	2,069,441	838,586	\$1,073,473	\$89,331	3,209	11,400	\$3,274,105	\$98.02
June 89	2,691,793		\$1,406,463	\$121,368	3,577	13,719	\$3,675,473	\$85.52
Dec 89	3,508,944	1,439,503	\$1,934,132	\$173,199	4,169	15,927	\$4,480,141	\$83.94
June 90	4,368,686		\$2,126,362	\$192,350	4,768	18,973	\$5,211,765	\$83.94
Dec 90	5,283,055	1,774,111	\$2,422,458	\$263,660	5,616	21,382	\$6,281,596	\$80.90
June 91	6,380,053		\$2,653,505	\$302,329	6,685	25,545	\$7,429,739	\$74.56
Dec 91	7,557,148	2,274,093	\$3,055,017	\$401,325	7,847	26,327	\$8,671,544	\$72.74
June 92	8,892,535		\$3,633,285	\$436,725	8,901	30,595	\$9,276,139	\$68.51
Dec 92	11,032,753	3,475,605	\$4,189,441	\$537,146	10,307	34,348	\$11,262,070	\$68.68
June 93	13,067,318		\$4,819,259	\$587,347	11,551	36,501	\$12,775,967	\$67.31
Dec 93	16,009,461	4,976,708	\$6,072,906	\$774,266	12,805	39,775	\$13,946,406	\$61.48
June 94	19,283,306		\$6,519,030	\$778,116	14,740	45,606	\$16,107,920	\$58.65
Dec 94	24,134,421	8,124,960	\$7,710,890	\$1,052,666	17,920	53,902	\$18,938,677	\$56.21
June 95	28,154,415		\$8,740,352	\$1,120,337	19,833	60,624	\$21,709,286	\$52.45
Dec 95	33,785,661	9,651,240	\$10,331,614	\$1,422,233	22,663	68,165	\$24,080,466	\$51.00
June 96	38,195,466		\$11,194,247	\$1,314,943	24,802	73,365	\$26,707,046	\$48.84
Dec 96	44,042,992	10,257,331	\$12,440,724	\$1,465,992	30,045	84,161	\$32,573,522	\$47.70
June 97	48,705,553		\$13,134,551	\$1,392,440	38,650	97,039	\$37,454,294	\$43.86
Dec 97	55,312,293	11,269,301	\$14,351,082	\$1,581,765	51,600	109,387	\$46,057,911	\$42.78
June 98	60,831,431		\$15,286,660	\$1,584,891	57,674	113,111	\$50,178,812	\$39.88
Dec 98	69,209,321	13,897,028	\$17,846,515	\$1,915,578	65,887	134,754	\$60,542,774	\$39.43
June 99	76,284,753		\$19,368,304	\$1,922,416	74,157	141,929	\$66,782,827	\$40.24
Dec 99	86,047,003	16,837,682	\$20,650,185	\$2,163,001	81,698	155,817	\$71,264,865	\$41.24
June 00	97,035,925		\$24,645,365	\$1,971,625	95,733	159,645	\$76,652,358	\$45.15
Dec 00	109,478,031	23,431,028	\$27,820,655	\$1,911,356	104,288	184,449	\$89,624,387	\$45.27
June 01	118,397,734		\$30,905,721	\$1,727,058	114,059	186,317	\$99,728,965	\$45.56
Dec 01	128,374,512	18,896,481	\$34,110,163	\$2,209,387	127,540	203,580	\$105,030,101	\$47.37
June 02	134,561,370		\$36,707,086	\$1,846,267	131,350	186,956	\$118,418,677	\$47.42
Dec 02	140,766,842	12,392,330	\$39,801,101	\$2,049,245	139,338	192,410	\$126,922,347	\$48.40

Source: Cellular Telecommunications and Internet Association, *Semi-Annual Wireless Industry Survey*  
<http://www.wow-com.com/industry/stats/surveys/>.

Table 2: FCC's Semi-Annual Local Telephone Competition Survey

	Reporting Carriers <sup>1</sup>	Percent Resold <sup>2</sup>	Subscribers										Percent Change Dec 01 - Dec 02		
			Dec 1999		Dec 2000		Jun 2001		Dec 2001		Jun 2002			Dec 2002	
			Number	%	Number	%	Number	%	Number	%	Number	%			
Alabama	11	6 %	1,080,410		1,253,064		1,386,294		1,530,651		1,724,476		1,933,223	1 %	
Alaska	4	8	165,221		169,892		*		218,424		260,216		242,123	267,630	11
Arizona	13	3	1,125,121		1,624,668		1,855,115		2,018,410		2,171,021		2,412,908	2,520,058	16
Arkansas	7	3	719,949		715,467		743,928		801,275		976,127		1,136,802	1,148,493	18
California	16	4	8,544,941		12,283,369		12,710,520		14,184,625		14,997,358		15,873,264	17,406,588	16
Colorado	9	2	1,532,718		1,654,918		1,856,075		1,983,495		2,145,816		2,247,166	2,358,748	10
Connecticut	6	3	1,077,089		1,136,618		1,277,123		1,418,367		1,616,937		1,548,076	1,665,314	3
Delaware	5	2	236,888		275,219		271,014		389,284		412,611		433,049	437,149	6
Dist. of Columbia	6	7	346,681		333,815		354,735		382,437		464,489		415,393	471,506	17
Florida	11	8	5,138,079		4,983,478		6,309,985		7,536,630		8,571,724		8,139,521	8,466,135	1
Georgia	14	6	2,538,683		2,687,238		2,754,784		4,076,119		4,020,010		4,171,843	4,390,786	9
Hawaii	6	1	288,425		454,364		524,201		543,283		505,721		640,246	680,573	16
Idaho	10	8	271,436		296,066		344,564		398,781		444,864		500,693	556,064	21
Illinois	10	5	3,922,482		4,309,660		5,143,767		5,631,944		5,631,172		5,496,664	6,401,630	14
Indiana	8	7	1,718,975		1,717,378		1,715,074		1,781,247		1,897,049		1,999,451	2,235,783	24
Iowa	12	9	774,773		975,629		832,106		861,382		1,085,608		1,177,580	1,239,384	14
Kansas	12	3	660,472		724,024		801,293		901,225		956,080		1,061,154	1,113,429	16
Kentucky	10	6	911,300		999,544		1,026,334		1,176,736		1,305,688		1,402,802	1,393,060	7
Louisiana	10	11	1,257,106		1,294,693		1,306,457		1,677,292		1,838,244		2,086,529	2,107,123	13
Maine	5	1	187,015		283,640		359,786		399,616		421,313		457,835	466,896	9
Maryland <sup>3</sup>	8	2	1,634,625		2,013,058		2,308,651		2,446,818		2,614,216		2,684,441	2,909,412	12
Massachusetts	6	2	1,892,014		2,228,169		2,649,130		2,753,685		2,968,667		3,254,877	3,604,493	12
Michigan	14	7	3,512,813		3,423,435		3,591,719		4,071,091		4,238,399		4,770,530	4,517,129	7
Minnesota	12	5	1,530,411		1,805,560		1,851,430		2,014,317		2,153,857		2,254,895	2,413,033	12
Mississippi	11	12	653,335		409,038		786,577		993,781		980,978		1,039,779	1,053,049	7
Missouri	11	5	1,855,452		1,848,725		1,767,411		1,937,684		2,106,899		2,246,269	2,275,423	8
Montana	4	1	*		*		*		*		229,349		291,429	315,512	13
Nebraska	8	2	576,296		640,085		659,380		712,685		791,299		838,568	887,810	10
Nevada	8	3	730,335		825,163		684,752		769,581		842,155		803,785	983,075	17
New Hampshire	8	11	280,308		389,254		387,264		443,181		492,112		539,458	535,450	7
New Jersey	6	2	2,280,181		2,590,291		3,575,130		3,896,778		4,286,643		4,570,663	4,862,403	7
New Mexico	10	10	365,427		395,111		443,343		619,582		660,849		731,107	780,835	18
New York	12	4	4,833,816		5,016,524		5,918,136		6,749,096		7,247,181		7,713,977	8,898,347	23
North Carolina	12	6	2,556,668		2,730,178		3,105,811		3,377,331		3,605,441		4,429,632	3,940,296	9
North Dakota	5	4	2,237,286		3,228,360		4,130,498		4,255,934		4,379,395		4,887,335	5,129,866	9
Ohio	14	4	826,637		929,513		1,124,214		1,290,234		1,266,357		1,366,437	1,432,525	11
Oklahoma	12	3	914,648		1,082,212		1,201,207		1,368,969		1,392,279		1,457,883	1,682,343	20
Oregon	11	3	2,762,474		3,850,322		4,129,186		4,378,216		4,849,185		4,986,819	5,249,163	8
Pennsylvania	11	3	1,090,005		757,613		1,374,747		1,128,736		1,136,619		1,354,203	1,524,203	11
Puerto Rico	6	12	*		*		*		*		*		*	*	NA
Rhode Island	6	2	229,304		313,530		355,889		401,805		454,936		461,004	512,389	13
South Carolina	10	15	1,137,232		1,236,338		1,292,586		1,502,345		1,625,292		1,724,156	1,781,083	18
South Dakota	5	7	*		*		*		*		278,646		292,210	325,114	17
Tennessee	12	7	1,529,654		1,876,444		1,983,851		2,251,208		2,443,483		2,573,801	2,626,423	7
Texas	19	5	3,292,453		6,203,423		7,438,437		8,294,338		9,062,104		9,721,085	9,934,529	10
Utah	10	2	643,824		692,066		790,244		833,492		919,102		970,834	1,075,522	15
Vermont	5	4	*		*		*		*		*		*	*	NA
Virgin Islands	5	4	*		*		*		*		*		*	*	NA
Virginia <sup>3</sup>	12	3	2,262,567		2,447,687		2,708,342		3,069,420		3,230,165		3,429,430	3,749,893	15
Washington	11	4	1,836,475		2,144,767		2,386,082		2,493,214		2,706,650		2,846,197	2,864,458	6
West Virginia	9	9	241,265		347,296		392,384		452,036		498,811		549,721	576,339	16
Wisconsin	10	7	1,525,818		1,342,908		1,698,520		2,048,629		2,229,389		2,322,479	2,384,977	7
Wyoming	4	2	127,634		*		*		173,939		194,665		168,232	161,930	4
Nationwide	NS	5 %	79,698,185		99,643,058		101,043,219		114,028,928		122,399,945		128,845,831	136,261,491	11 %

NA - Not Applicable

\* Data withheld to maintain firm confidentiality.

1/ Carriers with under 10,000 subscribers in a state were not required to report for that state.

2/ Percentage of mobile wireless subscribers receiving their service from a mobile wireless reseller.

3/ Subscribers counts for the District of Columbia, Maryland, and Virginia have been revised for previous periods other than June 2000.

Source: Local Telephone Competition Status as of December 31, 2002. Federal Communications Commission, June 2003 (Table 1.3: Mobile Wireless Telephone Subscribers).

**Table 3: Economic Area Penetration Rates**

EA	EA Name	Subscribers	2000 Census	EA penetration rate	EA density
34	Tampa-St. Petersburg-Clearwater, FL	1,335,363	2,395,997	55.73%	891.0
10	New York-No. New Jer.-Long Island, NY-NJ-CT-PA-MA-VT	13,607,067	25,712,577	52.92%	890.6
12	Philadelphia-Wilmington-Atl. City, PA-NJ-DE-MD	3,857,780	7,309,792	52.78%	778.8
161	San Diego, CA	1,628,114	2,813,833	57.86%	660.5
64	Chicago-Gary-Kenosha, IL-IN-WI	5,455,054	10,328,854	52.81%	556.5
55	Cleveland-Akron, OH-PA	1,983,225	4,692,460	42.26%	427.8
3	Boston-Worcester-Lawrence-Lowell-Brockton, MA-NH-RI-VT	4,263,353	7,954,554	53.60%	421.8
31	Miami-Fort Lauderdale, FL	3,311,130	5,602,222	59.10%	413.8
13	Washington-Baltimore, DC-MD-VA-WV-PA	5,003,728	8,403,130	59.55%	402.8
63	Milwaukee-Racine, WI	1,056,619	2,255,183	46.85%	366.9
57	Detroit-Ann Arbor-Flint, MI	3,794,344	6,963,637	54.49%	364.1
50	Dayton-Springfield, OH	451,137	1,133,004	39.82%	318.5
49	Cincinnati-Hamilton, OH-KY-IN	1,075,343	2,184,860	49.22%	294.1
11	Harrisburg-Lebanon-Carlisle, PA	498,960	1,125,265	44.34%	292.4
20	Norfolk-Virginia Beach-Newport News, VA-NC	924,504	1,722,764	53.66%	289.9
160	Los Angeles-Riverside-Orange County, CA-AZ	9,485,741	18,003,420	52.69%	286.1
53	Pittsburgh, PA-WV	1,364,699	2,971,829	45.92%	284.8
33	Sarasota-Bradenton, FL	389,839	763,795	51.04%	273.6
163	San Francisco-Oakland-San Jose, CA	5,126,825	9,111,806	56.27%	271.1
30	Orlando, FL	1,943,099	3,642,540	53.34%	265.8
40	Atlanta, GA-AL-NC	3,397,545	5,471,412	62.10%	246.0
23	Charlotte-Gastonia-Rock Hill, NC-SC	1,071,319	2,031,519	52.73%	240.5
32	Fort Myers-Cape Coral, FL	429,957	692,265	62.11%	234.3
133	McAllen-Edinburg-Mission, TX	478,031	978,369	48.86%	222.0
8	Buffalo-Niagara Falls, NY-PA	583,482	1,507,759	38.70%	212.9
62	Grand Rapids-Muskegon-Holland, MI	657,141	1,881,991	34.92%	206.8
170	Seattle-Tacoma-Bremerton, WA	2,286,128	4,135,291	55.28%	190.4
51	Columbus, OH	974,843	2,349,060	41.50%	190.4
18	Greensboro-Winston-Salem-High Point, NC-VA	877,273	1,854,853	47.30%	189.1
19	Raleigh-Durham-Chapel Hill, NC	1,008,819	1,831,510	55.08%	188.4
164	Sacramento-Yolo, CA	1,258,188	2,311,567	54.43%	188.1
172	Honolulu, HI	706,712	1,211,537	58.33%	187.2
65	Elkhart-Goshen, IN-MI	315,244	936,245	33.67%	185.7
41	Greenville-Spartanburg-Anderson, SC-NC	631,558	1,248,824	50.57%	183.6
70	Louisville, KY-IN	671,230	1,416,914	47.37%	180.9
83	New Orleans, LA-MS	881,511	1,725,338	51.09%	171.9
67	Indianapolis, IN-IL	1,364,398	3,066,469	44.49%	171.4
131	Houston-Galveston-Brazoria, TX	3,184,408	5,632,853	56.53%	169.2
7	Rochester, NY-PA	466,524	1,493,518	31.24%	167.2
44	Knoxville, TN	467,294	983,329	47.52%	165.6
22	Fayetteville, NC	258,032	528,224	48.85%	164.6
56	Toledo, OH	575,990	1,294,395	44.50%	163.9
66	Fort Wayne, IN	270,422	725,847	37.26%	158.5
130	Austin-San Marcos, TX	806,102	1,349,267	59.74%	156.1
81	Pensacola, FL	321,837	623,252	51.64%	154.1

26	Charleston-North Charleston, SC	337,688	587,297	57.50%	149.8
43	Chattanooga, TN-GA	320,302	720,375	44.46%	145.3
45	Johnson City-Kingsport-Bristol, TN-VA	258,641	576,081	44.90%	144.5
60	Appleton-Oshkosh-Neenah, WI	163,720	433,250	37.79%	143.6
82	Biloxi-Gulfport-Pascagoula, MS	181,074	396,754	45.64%	143.5
84	Baton Rouge, LA-MS	360,788	739,673	48.78%	140.3
78	Birmingham, AL	840,055	1,578,903	53.20%	137.1
5	Albany-Schenectady-Troy, NY	477,695	1,171,669	40.77%	134.7
46	Hickory-Morganton, NC-TN	199,887	519,208	38.50%	131.9
42	Asheville, NC	217,924	444,594	49.02%	128.6
96	St. Louis, MO-IL	1,713,867	3,558,651	48.16%	127.0
24	Columbia, SC	470,366	932,115	50.46%	126.0
52	Wheeling, WV-OH	98,045	327,645	29.92%	124.5
15	Richmond-Petersburg, VA	773,113	1,446,123	53.46%	124.0
74	Huntsville, AL-TN	489,343	997,824	49.04%	119.1
127	Dallas-Fort Worth, TX-AR-OK	3,939,831	7,645,530	51.53%	119.0
54	Erie, PA	168,550	519,348	32.45%	116.4
29	Jacksonville, FL-GA	1,008,013	1,885,190	53.47%	112.5
14	Salisbury, MD-DE-VA	133,529	363,970	36.69%	111.2
102	Davenport-Moline-Rock Island, IA-IL	249,327	558,913	44.61%	108.3
25	Wilmington, NC-SC	437,363	878,267	49.80%	107.4
71	Nashville, TN-KY	1,173,096	2,444,643	47.99%	105.1
6	Syracuse, NY-PA	685,817	1,902,640	36.05%	104.7
73	Memphis, TN-AR-MS-KY	869,480	1,882,332	46.19%	103.0
103	Cedar Rapids, IA	220,243	384,577	57.27%	101.3
85	Lafayette, LA	281,290	601,654	46.75%	100.0
162	Fresno, CA	592,579	1,419,998	41.73%	98.6
2	Portland, ME	318,218	748,817	42.50%	98.6
17	Roanoke, VA-NC-WV	372,178	826,284	45.04%	97.8
158	Phoenix-Mesa, AZ-NM	1,834,796	3,407,197	53.85%	93.9
9	State College, PA	280,918	809,979	34.68%	92.4
28	Savannah, GA-SC	321,449	668,214	48.11%	91.9
101	Peoria-Pekin, IL	232,899	528,671	44.05%	91.0
27	Augusta-Aiken, GA-SC	256,061	604,799	42.34%	89.8
87	Beaumont-Port Arthur, TX	213,655	456,637	46.79%	89.2
99	Kansas City, MO-KS	1,261,851	2,469,340	51.10%	88.7
92	Fayetteville-Springdale-Rogers, AR-MO-OK	177,573	405,160	43.83%	88.4
21	Greenville, NC	382,332	823,517	46.43%	87.7
48	Charleston, WV-KY-OH	404,431	1,199,373	33.72%	85.4
39	Columbus, GA-AL	254,726	496,538	51.30%	84.1
134	San Antonio, TX	1,013,681	2,141,060	47.34%	83.0
107	Minneapolis-St. Paul, MN-WI-IA	2,262,258	4,498,286	50.29%	83.0
47	Lexington, KY-TN-VA-WV	654,494	1,851,367	35.35%	80.4
167	Portland-Salem, OR-WA	1,438,644	2,883,737	49.89%	76.0
69	Evansville-Henderson, IN-KY-IL	367,147	854,714	42.96%	75.3
80	Mobile, AL	289,482	676,258	42.81%	74.8
93	Joplin, MO-KS-OK	102,316	263,904	38.77%	74.7
68	Champaign-Urbana, IL	253,397	630,898	40.16%	73.5
124	Tulsa, OK-KS	650,809	1,384,426	47.01%	72.4



104	Madison, WI-IL-IA	402,418	933,823	43.09%	71.3
72	Paducah, KY-IL	56,042	226,586	24.73%	70.0
79	Montgomery, AL	239,775	481,137	49.84%	66.9
125	Oklahoma City, OK	774,495	1,698,197	45.61%	65.0
35	Tallahassee, FL-GA	334,360	720,434	46.41%	63.5
38	Macon, GA	313,486	768,701	40.78%	62.9
37	Albany, GA	151,812	468,178	32.43%	62.7
118	Omaha, NE-IA-MO	492,197	1,044,156	47.14%	62.4
159	Tucson, AZ	495,573	999,882	49.56%	60.0
97	Springfield, IL-MO	245,684	517,462	47.48%	58.2
98	Columbia, MO	157,350	369,014	42.64%	58.0
88	Shreveport-Bossier City, LA-AR	233,657	573,616	40.73%	58.0
4	Burlington, VT-NY	186,248	605,393	30.76%	57.6
89	Monroe, LA	149,561	333,519	44.84%	56.1
106	Rochester, MN-IA-WI	157,011	318,374	49.32%	55.6
36	Dothan, AL-FL-GA	120,426	332,409	36.23%	53.7
105	La Crosse, WI-MN	54,764	241,903	22.64%	53.7
86	Lake Charles, LA	215,364	536,758	40.12%	52.4
141	Denver-Boulder-Greeley, CO-KS-NE	2,335,988	3,984,105	58.63%	52.0
95	Jonesboro, AR-MO	107,880	303,852	35.50%	51.3
16	Staunton, VA-WV	171,964	334,087	51.47%	51.0
61	Traverse City, MI	70,091	286,745	24.44%	50.7
119	Lincoln, NE	178,073	379,321	46.95%	50.2
75	Tupelo, MS-AL-TN	230,214	625,002	36.83%	49.8
77	Jackson, MS-AL-LA	593,570	1,432,518	41.44%	49.7
94	Springfield, MO	321,087	859,559	37.35%	48.1
100	Des Moines, IA-IL-MO	748,786	1,683,257	44.48%	47.3
91	Fort Smith, AR-OK	114,606	329,136	34.82%	46.5
132	Corpus Christi, TX	235,222	549,012	42.84%	46.5
90	Little Rock-North Little Rock, AR	700,992	1,614,850	43.41%	46.1
166	Eugene-Springfield, OR-CA	329,133	791,776	41.57%	43.1
76	Greenville, MS	97,365	252,280	38.59%	41.0
117	Sioux City, IA-NE-SD	91,763	252,656	36.32%	39.5
152	Salt Lake City-Ogden, UT-ID	1,009,595	2,088,974	48.33%	35.7
123	Topeka, KS	179,799	454,539	39.56%	35.6
59	Green Bay, WI-MI	289,283	671,225	43.10%	34.2
108	Wausau, WI	192,046	487,723	39.38%	34.1
157	El Paso, TX-NM	309,851	955,602	32.42%	33.0
58	Northern Michigan, MI	30,911	269,986	11.45%	28.5
169	Richland-Kennewick-Pasco, WA	275,354	677,674	40.63%	27.7
137	Lubbock, TX	177,227	374,626	47.31%	27.2
153	Las Vegas, NV-AZ-UT	898,876	1,709,797	52.57%	23.7
147	Spokane, WA-ID	352,752	829,735	42.51%	23.6
1	Bangor, ME	*	526,106	*	20.9
156	Albuquerque, NM-AZ	454,076	921,086	49.30%	20.9
122	Wichita, KS-OK	416,387	1,175,577	35.42%	20.5
128	Abilene, TX	80,260	222,147	36.13%	20.3
109	Duluth-Superior, MN-WI	145,751	350,059	41.64%	18.5
113	Fargo-Moorhead, ND-MN	161,626	371,691	43.48%	16.4

155	Farmington, NM-CO	86,362	193,872	44.55%	16.0
116	Sioux Falls, SD-IA-MN-NE	241,324	519,143	46.49%	15.1
165	Redding, CA-OR	138,134	336,820	41.01%	14.4
149	Twin Falls, ID	71,395	162,397	43.96%	14.1
150	Boise City, ID-OR	273,879	574,876	47.64%	13.7
139	Santa Fe, NM	114,412	258,790	44.21%	13.1
126	Western Oklahoma, OK	58,060	139,761	41.54%	12.0
138	Amarillo, TX-NM	216,278	481,633	44.91%	11.8
120	Grand Island, NE	101,188	288,047	35.13%	11.6
136	Hobbs, NM-TX	65,699	190,340	34.52%	11.2
148	Idaho Falls, ID-WY	139,264	306,120	45.49%	10.9
146	Missoula, MT	154,364	399,183	38.67%	10.8
110	Grand Forks, ND-MN	88,977	230,253	38.64%	10.2
135	Odessa-Midland, TX	164,993	388,007	42.52%	10.1
129	San Angelo, TX	79,794	202,679	39.37%	10.1
140	Pueblo, CO-NM	100,157	279,600	35.82%	8.7
168	Pendleton, OR-WA	61,713	200,681	30.75%	8.7
154	Flagstaff, AZ-UT	164,921	401,766	41.05%	8.2
142	Scottsbluff, NE-WY	24,854	92,360	26.91%	7.8
151	Reno, NV-CA	313,218	670,013	46.75%	7.6
111	Minot, ND	*	111,195	*	7.0
112	Bismarck, ND-MT-SD	73,115	175,427	41.68%	6.3
114	Aberdeen, SD	*	82,608	*	5.4
143	Casper, WY-ID-UT	166,979	408,708	40.86%	5.2
115	Rapid City, SD-MT-NE-ND	81,387	213,696	38.09%	5.0
121	North Platte, NE-CO	*	61,758	*	5.0
144	Billings, MT-WY	161,907	404,902	39.99%	4.9
145	Great Falls, MT	55,629	166,564	33.40%	4.2
171	Anchorage, AK	285,300	626,932	45.51%	1.0

\* Data withheld to maintain firm confidentiality.

Source: Federal Communications Commission internal analysis based on preliminary year-end 2002 filings for Numbering Resource Utilization in the United States. Density is persons per square mile.

**Table 4: Top 25 Mobile Telephone Operators by Subscribers  
(in thousands)**

Year-End 2001			Year-End 2002	
	Operator	Total	Operator	Total
1	Verizon Wireless	29,398	Verizon Wireless	32,491
2	Cingular Wireless	21,596	Cingular Wireless	21,900
3	AT&T Wireless	18,047	AT&T Wireless	20,900
4	Sprint PCS	13,555	Sprint PCS	14,760
5	Nextel	8,667	Nextel	10,612
6	VoiceStream	6,993	T-Mobile	9,913
7	ALLTEL	6,683	ALLTEL	7,600
8	US Cellular	3,461	US Cellular	4,103
9	Western Wireless	1,177	Leap Wireless	1,512
10	Leap Wireless	1,119	Western Wireless	1,197
11	Qwest	1,114	Qwest	1,034
12	Telecorp	1,018	Centennial (1)	897
13	Centennial	827	Nextel Partners	877
14	CenturyTel	797	Triton PCS	830
15	Dobson Comm.	700	Dobson Comm.	768
16	Triton PCS	686	Rural Cellular	722
17	American Cellular	657	American Cellular	690
18	Rural Cellular	647	Alamosa PCS	622
19	Price Wireless	570	AirGate	589
20	Nextel Partners	516	US Unwired	561
21	Alamosa PCS	503	Broadwing	470
22	Broadwing	462	Midwest Wireless	300
23	AirGate	453	Horizon PCS	271
24	PrimeCo	385	Ntelos	267
25	PR. Tel. Co.	327	Southern LINC	260

Sources: For 2001, see *Seventh Report*, at 13094. For 2002, publicly available company documents such as operators' news releases and filings made with the Securities and Exchange Commission. Southern LINC, *Frequently Asked Questions* (visited May 29, 2003) <<http://www.southernlinc.com/faqs.asp>>. Midwest Wireless, *Midwest Wireless and DTN Market Access Team Up to Deliver Commodity Quotes to Wireless Phones*, News Release, May 27, 2003.

Notes

(1) As of Nov. 30, 2002.

**Table 5: Estimated Mobile Telephone Rollouts  
by Number of Launches by County**

Total Number of Providers in a County	Number of Counties	POPs Contained in Those Counties (1)	% of Total US POPs	Square Miles Contained in Those Counties	% of Total US Square Miles
3 or More	2232	270,233,931	94.7%	1,861,820	51.6%
4 or More	1674	254,738,264	89.3%	1,301,067	36.1%
5 or More	1211	235,569,285	82.6%	940,523	26.1%
6 or More	789	202,753,811	71.1%	642,426	17.8%
7 or More	259	72,474,947	25.4%	230,073	6.4%

**Table 6: County Quartiles with Estimated Rollout by at least 3 Mobile Telephone Providers**

County Quartile Based on Population	Total Number of Counties (2)	Number of Counties with at least 3 Providers	Percent of Counties in Quartile with at least 3 Providers	Total POPs in Quartile Counties (1)	POPs in Counties with at least 3 Providers	Percent of Quartile POPs with at least 3 Providers
1st Quartile	805	781	97.0%	234,640,253	232,508,956	99.1%
2nd Quartile	805	659	81.9%	31,425,466	26,141,620	83.2%
3rd Quartile	804	527	65.6%	14,135,298	9,490,930	67.1%
4th Quartile	805	263	32.7%	5,029,499	1,988,010	39.5%

Source: Federal Communications Commission estimates based on publicly available information.

Notes:

- (1) POPs from the 2000 Census.
- (2) United States and Puerto Rico

**Table 7: Mobile Telephone Digital Coverage**

Technology	POPs in Those Areas (1)	% of Total POPs (2)	Square Miles Contained in Those Counties	% of Total Square Miles
CDMA	259,854,520	91.1%	1,849,933.6	51.3%
TDMA / GSM	265,342,450	93.0%	1,928,473.1	53.5%
iDEN	248,006,454	86.9%	1,295,614.2	35.9%
Total Digital	277,586,564	97.3%	2,573,948.1	71.4%

Source: Federal Communications Commission estimates based on publicly available information.

Notes:

Broadband PCS and digital SMR licensees are analyzed by county; cellular licensees are analyzed by cellular market areas ("CMAs").

POPs from the 2000 Census.

**Table 8: Change in CPI**

	CPI		Cellular CPI		All Telephone CPI		Local Telephone CPI		Long Distance Telephone CPI	
	Index Value	Annual Change	Index Value	Annual Change	Index Value	Annual Change	Index Value	Annual Change	Index Value	Annual Change
1997	100		100		100		100		100	
1998	101.6	1.6%	95.1	-4.9%	100.7	0.7%	101.6	1.6%	100.5	0.5%
1999	103.8	2.2%	84.9	-10.7%	100.1	-0.6%	103.4	1.8%	98.2	-2.3%
2000	107.3	3.4%	76	-10.5%	98.5	-1.6%	107.7	4.1%	91.8	-6.5%
2001	110.3	2.8%	68.1	-10.4%	99.3	0.8%	113.3	5.2%	88.8	-3.3%
2002	112.1	1.6%	67.4	-1.0%	99.7	0.4%	118.5	4.5%	84.9	-4.4%
1997 to 2002		12.1%		-32.6%		-0.3%		18.5%		-15.1%

Source: Bureau of Labor Statistics.

**Table 9: Average Revenue Per Minute**

	Average Local Monthly Bill	Minutes of Use Per Month	Average Revenue Per Minute	Annual Change
1993	\$61.49	140	\$0.44	
1994	\$56.21	119	\$0.47	8%
1995	\$51.00	119	\$0.43	-9%
1996	\$47.70	125	\$0.38	-11%
1997	\$42.78	117	\$0.37	-4%
1998	\$39.43	136	\$0.29	-21%
1999	\$41.24	185	\$0.22	-23%
2000	\$45.27	255	\$0.18	-20%
2001	\$47.37	380	\$0.12	-30%
2002	\$48.40	427	\$0.11	-9%

Source: See Appendix D, Table 1, at D-2 (ARPU); Dec 2002 CTIA Survey, at 208 (minutes of use).

**Table 10: Market Entry Over Time**

Total Number of Providers in a County	Percent of Total US POPs Covered			
	Eighth Report	Seventh Report	Sixth Report	Fifth Report
3 or more	94.7%	94.1%	90.8%	87.8%
4 or more	89.3%	88.7%	84.4%	79.8%
5 or more	82.6%	80.4%	75.1%	68.5%
6 or more	71.1%	53.1%	46.7%	34.6%
7 or more	25.4%	21.2%	11.9%	4.4%

Source: FCC estimates

**Table 11: U.S. Mobile Telephone Operators'  
Holdings in Foreign Mobile Operators**

Operator	Country	Subscribers (Brand name)	Venture	Ownership (%)
SBC	Denmark	1.975 million	Tele Danmark	41.6
	Belgium	4.07 million (Proximus)	Belgacom	17.5 (controls 24.36% through investment in Tele Danmark, which owns 16.5% of Belgacom)
	South Africa	6.395 million (Vodacom)	Telkom SA(owns 50% of Vodacom)	18
	Mexico	20.067 million	America Movil	8
BellSouth	Uruguay	143,000 (Movicom)	Abiatar	46
	Guatemala	193,000	BellSouth Guatemala	60
	Nicaragua	201,000	Nicacell	89
	Ecuador	632,000	Otecel	89.4
	Panama	335,000	BellSouth Panama	43.7
	Brazil (Sao Paulo)	1.669 million	BCP	45.4
	Brazil (northeast)	1.005 million	BCP	47.1
	Venezuela	3.107 million	Telcel	78.2
	Argentina	1.32 million	Movicom/ BellSouth	65
	Chile	1.032 million	BellSouth Chile	100
	Columbia	1.349 million	Celumovil	66
	Peru	530,000	Tele 2000	97.4
	Denmark	1.103 million	Sonafon	46.5
	Israel	2.53 million	Cellcom	34.7
AT&T	Canada	3.356 million	Rogers Wireless	34.3
	Taiwan	4.341 million	FarEasTone	22.7
	Slovakia	1.298 million	EuroTel Bratislava	24.5
	India	1.204 million	IDEA Cellular	33
	India	1 million (BPL Mobile)	BPL Cellular	49
	Antigua & Barbuda	NA	Antigua Wireless	85
	Bermuda	NA	Telecommunicatio ns Limited	60
	Dominica	NA	Wireless Ventures	100
	St. Lucia	NA	Wireless Ventures	69
	St. Vincent & Grenadines	NA	Wireless Ventures	100
Verizon	Italy	19 million	Omnitel Pronto Italia	23.1
	Slovakia	1.298 million	EuroTel Bratislava	24.5
	Greece	2.514 million	STET Hellas	17.5

	Indonesia	1.823 million	Excelcomindo	23.1
	Japan	3.849 million	Tu-Ka	2.7-5
	New Zealand	1.229 million	Telecom New Zealand	21.5
	Philippines	NA (Extelcom)	BayanTel (owns 46.6% stake in wireless provider Extelcom)	19.4
	Argentina	1.006 million (CTI Movil)	CTI Holdings	65.3
	Canada	2.996 million	TELUS Corporation	23.7
	Venezuela	2.561 million	CANTV	28.5
	Taiwan	6.24 million	Taiwan Cellular Corporation	13
	Dominican Republic	550,000	CODETEL	100
Western Wireless International	Ireland	145,000	Meteor	81
	Austria	318,000	tele.ring	99.5
	Slovenia	NA	Western Wireless	100
	Georgia	NA	MagtiCom	14.5
	Ghana	NA	Western Telesystems	56.7
	Cote d'Ivoire	NA	CORA de Comstar	40
	Bolivia	NA	NuevaTel	71.5
	Haiti	NA	COMCEL	51
Nextel International	Canada	NA	NII Holdings	36
	Japan	NA		
	Argentina	NA		
	Brazil	NA		
	Mexico	517,000		
	Peru	NA		
	Philippines	NA		

Sources: Publicly available information such as operators' news releases, web sites and filings with the Securities and Exchange Commission. Subscriber figures for a number of foreign affiliates are from Linda Mutschler, *Global Wireless Matrix 4Q02*, Merrill Lynch Global Securities Research, Apr. 2, 2003.



**Table 12: Mobile Performance in Selected Countries**

Country	CPP or MPP	Penetration (%)	Share of Prepaid (%)	MOUs	Revenue per Minute (\$)
USA	MPP	49	5	458	0.12
Canada	MPP	37		270	0.11
UK	CPP	85	69	132	0.22
Germany	CPP	72	54	72	0.29
Italy	CPP	93		121	0.20
France	CPP	63		156	0.20
Finland	CPP	85		146	0.24
Japan	CPP	62	3	170	0.30
South Korea	CPP	68	1	296	0.10
Australia	CPP	68		173	0.16

Sources: Linda Mutschler, *Global Wireless Matrix 4Q02*, Global Securities Research, Merrill Lynch, Apr. 2, 2003; Linda Mutschler, *The Next Generation VII*, Global Securities Research, Merrill Lynch, Feb. 21, 2003.